

PATENT ABSTRACTS OF JAPAN

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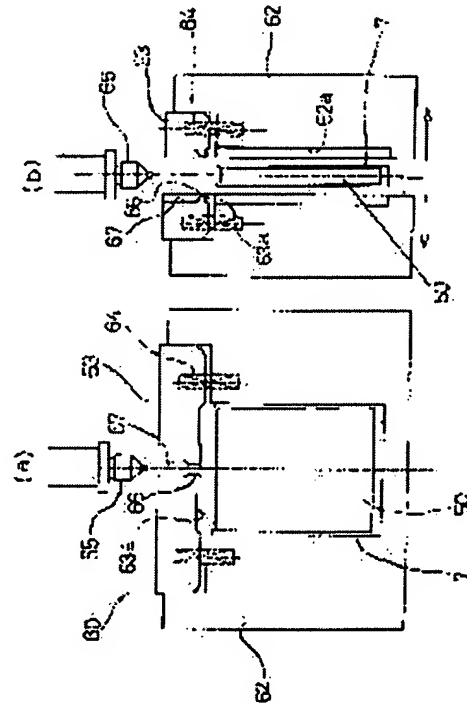
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(54) RESIN SEALING MOLDING APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a resin sealing molding apparatus which resin-seals an optional surface of a product to form an exterior body.

SOLUTION: A semi-finished article 50 produced by assembling a plurality of components integrally is housed in a pack case 7 with its bottom surface opened, the case 7 is arranged in the cavity 62a of a cavity 62, a mold is closed, a resin injection nozzle 65 is advanced, a core 63 is pushed to the cavity 62 against the bias of a spring 64, a resin is packed in a filling space 63a, and the open bottom surface of the pack case 7 is resin-sealed.



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CLAIMS

[Claim(s)]

[Claim 1] The cavity which is resin seal shaping equipment which is filled up with resin and carries out the resin seal of the product, and holds said product in the necessary side of a product, The core in which the gate connected with the restoration space of resin was formed, and the elastic member which energizes this core in the direction which separates from a cavity, Resin seal shaping equipment characterized by coming to have the resin impregnation nozzle which a nozzle tip is made to contact said gate, and resists the cavity which held the product in said cavity at energization of said elastic member, presses a core, and fills up said restoration space with resin through the gate from a nozzle.

[Claim 2] A cavity and a core are resin seal shaping equipment according to claim 1 which the rate mold which pokes a gate location and is made into a mating face comes to constitute.

[Claim 3] Resin seal shaping equipment according to claim 1 or 2 with which it comes to form restoration space in the location corresponding to the field which holds the necessary side for a product in a wrap case, and is not covered by the case.

[Claim 4] Resin seal shaping equipment according to claim 1 or 2 with which the external surface and predetermined spacing are prepared, a product is supported to a suspending state a cavity and incore, and it comes to prepare restoration space all over a product.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is filled up with the resin which carried out melting so that the component of a product might be covered, and relates to the resin seal shaping equipment which forms the sheathing object which closed the product with the stiffened resin.

[0002]

[Description of the Prior Art] There is no operating environment uniformly, and a product like pocket electronic equipment requires protection against dust, a dripproof structure or fall-proof, and shock resistance at the same time a miniaturization, thin-shape-izing, and lightweight-ization are required, since it is accompanied by migration. In order to fill these demands, the structure of the sheathing object of a product serves as an important element. Drawing 12 is an example of a product, it shows the example of a configuration of the cell pack used as a power source of pocket electronic equipment, held a rechargeable battery 80 and the circuit board 84 which constituted the cell protection network etc. in the sheathing inside of the body, and has met the demand as a power source of pocket electronic equipment.

[0003] The sheathing object of this cell pack consists of pack cases which consist of a bottom case 82 and an upper case 83. As are shown in drawing 12 (a), and the circuit board 84 which constituted the cell protection network in the bottom case 82, an input/output terminal, a connection plate, etc. are arranged and it is shown on it at drawing 12 (b), the rechargeable battery 80 constituted as a rechargeable lithium-ion battery is arranged, and a rechargeable battery 80 is joined to a connection plate. Next, as shown in drawing 12 (c), a double-sided tape 85 is stuck on a cell 80, the upper case 83 is joined to the bottom case 82, and a cell pack is completed.

[0004] Junction in said bottom case 82 and the upper case 83 is made by ultrasonic jointing etc. in both periphery section. As shown in drawing 13, the case of ultrasonic jointing makes lobe 82a formed in the periphery section of the bottom case 82 insert in crevice 83a formed in the periphery section of the upper case 83, and carries out ultrasonic welding between the tip of lobe 82a, and the bottom of crevice 83a. The resin fused according to this junction structure is not outside exposed.

[0005]

[Problem(s) to be Solved by the Invention] However, with the configuration of the conventional sheathing object, the structure which joins the divided case was indispensable, and in order to join the upper case 83 to the bottom case 82 in the above-mentioned conventional example, the thickness of the side peripheral surface of both the cases 82 and 83 was needed, and the technical problem by which the increase of the volume as a pack case, i.e., a cell pack, and the increase of weight are accompanied occurred.

[0006] Moreover, the pack case was a hard case, in order to join the upper case 83 to the bottom case 82 and to expose an input/output terminal outside, it was difficult for a minute clearance to occur everywhere and to constitute in protection against dust and a dripproof structure, and it was the structure which is easy to damage by fall.

[0007] The target place has this invention in offering the resin seal shaping equipment for covering the internal configuration element of a product without a clearance with a thin sheathing object, and realizing protection against dust and a dripproof structure with a miniaturization and lightweight-ization.

[0008]

[Means for Solving the Problem] The cavity which this invention for attaining the above-mentioned purpose is resin seal shaping equipment which fills up the necessary side of a product with resin and carries out the resin seal of the product, and holds said product, The core in which the gate connected with the restoration space of resin was formed, and the elastic member which energizes this core in the

direction which separates from a cavity, A nozzle tip is made to contact said gate, the cavity which held the product in said cavity is resisted at energization of said elastic member, a core is pressed, and it is characterized by coming to have the resin impregnation nozzle which fills up said restoration space with resin through the gate from a nozzle.

[0009] Since according to the above-mentioned resin seal shaping equipment a core will resist energization of an elastic member, it will be pressed by the cavity and metal mold will be closed if a product is held and a resin impregnation nozzle is made to march out in a cavity, if resin is poured in from a resin impregnation nozzle, it will fill up with resin in restoration space. If the necessary side as for which a product carries out a resin seal is held in a cavity so that restoration space may be faced, the resin seal of the product will be carried out. Moreover, since between a cavity and cores is closed by advance actuation of a resin impregnation nozzle, hold of a product and ejection become easy.

[0010] In the above-mentioned configuration, a cavity and a core can be constituted in the rate mold which pokes a gate location and is made into a mating face, and receipts and payments of the product into metal mold are easy for them, and they can respond also to the undercut produced into a gate part.

[0011] Moreover, if restoration space is formed in the field which holds a product in a wrap case and is not covered [product] by the case in the necessary side, since the resin seal of the arbitration side of a product can be carried out and the clearance between a case and a product will also be filled up with resin, the miniaturization and sealing nature of a product by thin-shape-izing of a case can be planned.

[0012] Moreover, the external surface and predetermined spacing are prepared, a product is supported to a suspending state a cavity and incore, and if restoration space is prepared all over a product and it is filled up with resin, the resin seal of the whole surface of a product can be carried out.

[0013]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to an accompanying drawing, and an understanding of this invention is presented. In addition, the operation gestalt shown below is an example which materialized this invention, and does not limit the technical range of this invention.

[0014] The operation gestalt shown below shows the example applied to the pack case which closes the interior object of a cell pack (product). The rechargeable battery 1 constituted by the rechargeable lithium-ion battery of a flat form as a cell pack was shown in drawing 1 . The circuit board 9 which constituted the cell protection network which protects this rechargeable battery 1 from overcharge, overdischarge, etc. is combined with one. The middle finished product 50 as shown in drawing 2 is formed, this middle finished product 50 is held in the pack case 7, as shown in drawing 3 , and it constitutes in a cell pack, without carrying out the resin seal of the open end of the pack case 7, and spoiling the gestalt of a rechargeable battery 1.

[0015] Drawing 1 is what disassembles and shows said middle finished product 50. To the obturation section side of a rechargeable battery 1 The circuit board 9 which formed the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 while constituting the connection plate 11 joined to the positive-electrode terminal 25 of this rechargeable battery 1, the spacer 12 which is arranged on a rechargeable battery 1 and offers the bearing surface of the circuit board 9, and the cell protection network is arranged. The lead plate 10 which extends on a side face from the base of the cell can 31 which constitutes the negative electrode of a rechargeable battery 1 is arranged.

[0016] Base 11b of the connection plate 11 formed in the shape of [of L] a character is joined to the positive-electrode terminal 25 of said rechargeable battery 1, base 10b of the lead plate 10 is joined to the base of the cell can 31, and lead section 10a extends to an obturation section side along the side face of the cell can 31.

[0017] Moreover, a spacer 12 is attached in the obturation section side of a rechargeable battery 1 as shown in drawing 2 . Positioning fitting of the spacer 12 is carried out on a rechargeable battery 1, and the insulation between the cell cans 31 which are negative electrodes is strengthened. Moreover, lead section 11a of the connection plate 11 and lead section 10a of the lead plate 10 are joined on the circuit board 9 through a spacer 12 and the circuit board 9. Since the electronic parts mounted in the obturation section side of the circuit board 9 are held in the opening circles of a spacer 12, it will be in the condition that the laminating was carried out on the rechargeable battery 1, only in the height to which the circuit board 9 applied the thickness of the substrate, and the thickness of a spacer 12, and the increment in the height by preparing a cell protection network will be controlled.

[0018] Drawing 4 shows the circuit pattern formed in front flesh-side both sides of the circuit board 9, and the cell protection network and the input/output terminal are constituted on the substrate. As shown in drawing 4 (b), a cell protection network is constituted at the rear-face side (spacer 12 side) of the circuit board 9, and as shown in drawing 4 (a), conductor pattern 4 for plus terminals a, conductor pattern 5 for minus terminals a and conductor pattern 6a for temperature detection terminals, and the conductor pattern

16 for lead plates for connecting the conductor pattern 15 for connection plates and the lead plate 10 for connecting the connection plate 11 are formed in the front-face side. The circuit pattern formed in these both sides is connected by the through hole 30 at the key point. From the lead run through hole 20 formed in this circuit board 9, through and lead section 11a are bent on the conductor pattern 15 for connection plates, and lead section 11a of the connection plate 11 is soldered. Moreover, lead section 10a of the lead plate 10 is bent and soldered on the conductor pattern 16 for lead plates. By soldering this connection plate 11 and the lead plate 10, the circuit board 9 is fixed on a spacer 12.

[0019] As shown in drawing 4 (a), on the plus terminal 4 and conductor pattern 5a for minus terminals, the temperature detection terminal 6 is joined at the conductor pattern 4a top for plus terminals formed in the front-face side of the circuit board 9 on the minus terminal 5 and conductor pattern 6a for temperature detection terminals. These terminals become the thing excellent in conductivity, junction nature, and corrosion resistance by using the plate of a copper-nickel alloy, or the clad plate of the plate of this copper-nickel alloy, and stainless steel. Moreover, without joining a plate as a terminal, it can gold-plate at each conductor pattern, and can also use as a terminal as it is.

[0020] By attaching the circuit board 9 in a rechargeable battery 1 as mentioned above, as shown in drawing 2, the middle finished product 50 is formed. As this middle finished product 50 is shown in drawing 5 (a), on the top face 13 Plus terminal aperture 4c, In the pack case 7 where the pars basilaris ossis occipitalis 14 was wide opened as minus terminal aperture 5c and temperature detection terminal aperture 6c were prepared and it was shown in drawing 5 (c) It holds, as shown in drawing 5 (b), and the middle finished product 50 is sealed in the pack case 7 by carrying out a resin seal with the resin seal shaping equipment 60 which shows a pars basilaris ossis occipitalis 14 below.

[0021] Drawing 6 - drawing 9 show each process of the resin seal by resin seal shaping equipment 60 in order, and show it in the cross section of the 2-way which intersects a metal mold part perpendicularly with each drawing (a) and (b).

[0022] The cavity 62 and core 63 which constitute shaping metal mold enable it to correspond to the undercut produced by the sprue 67 of a gate part in drawing 6 while they are formed in rate mold structure and enable receipts and payments of the middle finished product 50. Cavernous 62a is formed in a cavity 62, and restoration space 63a of resin, the gate 66 connected with this restoration space 63a, and the sprue 67 connected with this gate 66 are formed in the core 63. Moreover, the core 63 is energized in the direction which separates from a cavity 62 with a spring (elastic member) 64. A cavity 62 is opened so that it may illustrate, the open end is made into a core 63 side, and the middle finished product 50 on which the pack case 7 was put is inserted into cavernous 62a.

[0023] Next, energization of a spring 64 is resisted and a cavity 62 is made to press a core 63 by closing a cavity 62 and a core 63 and making the resin impregnation nozzle 65 advance to a cavity 62 side, as shown in drawing 7. Since restoration space 63a which the core 63 stuck to the cavity 62 and was formed on the open end of the pack case 7 at the core 63 is located as shown in drawing 8, if the regurgitation of the resin 70 is carried out into sprue 67 from the resin impregnation nozzle 65, it will fill up with resin 70 in restoration space 63a through the gate 66. The resin seal of the open end of the pack case 7 is carried out by restoration of this resin 70. Moreover, since the resin 70 with which it filled up trespasses also upon the clearance between the pack case 7 and the middle finished product 50, it is unified, and even if the pack case 7 and the middle finished product 50 constitute the pack case 7 with thin resin mold goods, reinforcement is compensated with them, and a cell pack can be miniaturized.

[0024] After stiffening filled resin 70, if a cavity 62 and a core 63 are opened and the resin impregnation nozzle 65 is retreated as shown in drawing 9, the cell pack by which resin seal shaping was carried out can be taken out. Since garbage 70a made by the gate 66 and sprue 67 remains as shown in drawing 10 (a), as shown in drawing 10 (b), the pack case 7 and the cell pack which covered the middle finished product 50 with resin 70 complete the fabricated resin 70 by cutting this off.

[0025] The resin seal shaping equipment 60 explained above is constituted so that the resin seal of the pars basilaris ossis occipitalis of the pack case 7 opened wide may be carried out, but it can insert the middle finished product 50 into the case which uses a top face as an open end, and it can also constitute it so that opening may be formed in a part for a terminal area and the resin seal of the top face may be carried out. This can be carried out by forming in restoration space 63a of a core 63 the lobe which contacts a part for a terminal area.

[0026] Moreover, as shown in drawing 11, when the volume forms at the size to which cavernous 62a formed in a cavity 62 is made by the gap to the perimeter of the middle finished product 50 and prepares and constitutes the pin 75 which supports the middle finished product 50 to a suspending state at two or more places of the wall of cavernous 62a, the perimeter of the middle finished product 50 is filled up with the resin 70 poured in from the resin impregnation nozzle 65 so that it may illustrate, and it can carry out the resin seal of the whole surface. Also in this case, opening is formed in a part for a terminal area as

mentioned above.

[0027] The resin used for resin seal shaping explained above becomes what has the suitable hot melt of a polyamide system and a polyurethane system. Moreover, by adjusting so that the degree of hardness when stiffening resin may become low, the effectiveness of an impact absorption is acquired, the shock resistance to impacts, such as fall, improves in a cell pack, and it will become suitable as a power source of pocket electronic equipment.

[0028]

[Effect of the Invention] Since the resin seal of the arbitration external surface of a product can be carried out and a sheathing object can be thinly constituted according to this invention as the above explanation, the miniaturization of a product can be raised. Moreover, since a product can be covered in sealing structure, it can constitute in protection against dust and a drip-proof structure, and becomes a suitable thing to apply to pocket electronic equipment etc.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention is filled up with the resin which carried out melting so that the component of a product might be covered, and relates to the resin seal shaping equipment which forms the sheathing object which closed the product with the stiffened resin.

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PRIOR ART

[Description of the Prior Art] There is no operating environment uniformly, and a product like pocket electronic equipment requires protection against dust, a dripproof structure or fall-proof, and shock resistance at the same time a miniaturization, thin-shape-izing, and lightweight-ization are required, since it is accompanied by migration. In order to fill these demands, the structure of the sheathing object of a product serves as an important element. Drawing 12 is an example of a product, it shows the example of a configuration of the cell pack used as a power source of pocket electronic equipment, held a rechargeable battery 80 and the circuit board 84 which constituted the cell protection network etc. in the sheathing inside of the body, and has met the demand as a power source of pocket electronic equipment.

[0003] The sheathing object of this cell pack consists of pack cases which consist of a bottom case 82 and an upper case 83. As are shown in drawing 12 (a), and the circuit board 84 which constituted the cell protection network in the bottom case 82, an input/output terminal, a connection plate, etc. are arranged and it is shown on it at drawing 12 (b), the rechargeable battery 80 constituted as a rechargeable lithium-ion battery is arranged, and a rechargeable battery 80 is joined to a connection plate. Next, as shown in drawing 12 (c), a double-sided tape 85 is stuck on a cell 80, the upper case 83 is joined to the bottom case 82, and a cell pack is completed.

[0004] Junction in said bottom case 82 and the upper case 83 is made by ultrasonic jointing etc. in both periphery section. As shown in drawing 13, the case of ultrasonic jointing makes lobe 82a formed in the periphery section of the bottom case 82 insert in crevice 83a formed in the periphery section of the upper case 83, and carries out ultrasonic welding between the tip of lobe 82a, and the bottom of crevice 83a. The resin fused according to this junction structure is not outside exposed.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the resin seal of the arbitration external surface of a product can be carried out and a sheathing object can be thinly constituted according to this invention as the above explanation, the miniaturization of a product can be raised. Moreover, since a product can be covered in sealing structure, it can constitute in protection against dust and a dripproof structure, and becomes a suitable thing to apply to pocket electronic equipment etc.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, with the configuration of the conventional sheathing object, the structure which joins the divided case was indispensable, and in order to join the upper case 83 to the bottom case 82 in the above-mentioned conventional example, the thickness of the side peripheral surface of both the cases 82 and 83 was needed, and the technical problem by which the increase of the volume as a pack case, i.e., a cell pack, and the increase of weight are accompanied occurred.

[0006] Moreover, the pack case was a hard case, in order to join the upper case 83 to the bottom case 82 and to expose an input/output terminal outside, it was difficult for a minute clearance to occur everywhere and to constitute in protection against dust and a dripproof structure, and it was the structure which is easy to damage by fall.

[0007] The target place has this invention in offering the resin seal shaping equipment for covering the internal configuration element of a product without a clearance with a thin sheathing object, and realizing protection against dust and a dripproof structure with a miniaturization and lightweight-ization.

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MEANS

[Means for Solving the Problem] The cavity which this invention for attaining the above-mentioned purpose is resin seal shaping equipment which fills up the necessary side of a product with resin and carries out the resin seal of the product, and holds said product, The core in which the gate connected with the restoration space of resin was formed, and the elastic member which energizes this core in the direction which separates from a cavity, A nozzle tip is made to contact said gate, the cavity which held the product in said cavity is resisted at energization of said elastic member, a core is pressed, and it is characterized by coming to have the resin impregnation nozzle which fills up said restoration space with resin through the gate from a nozzle.

[0009] Since according to the above-mentioned resin seal shaping equipment a core will resist energization of an elastic member, it will be pressed by the cavity and metal mold will be closed if a product is held and a resin impregnation nozzle is made to march out in a cavity, if resin is poured in from a resin impregnation nozzle, it will fill up with resin in restoration space. If the necessary side as for which a product carries out a resin seal is held in a cavity so that restoration space may be faced, the resin seal of the product will be carried out. Moreover, since between a cavity and cores is closed by advance actuation of a resin impregnation nozzle, hold of a product and ejection become easy.

[0010] In the above-mentioned configuration, a cavity and a core can be constituted in the rate mold which pokes a gate location and is made into a mating face, and receipts and payments of the product into metal mold are easy for them, and they can respond also to the undercut produced into a gate part.

[0011] Moreover, if restoration space is formed in the field which holds a product in a wrap case and is not covered [product] by the case in the necessary side, since the resin seal of the arbitration side of a product can be carried out and the clearance between a case and a product will also be filled up with resin, the miniaturization and sealing nature of a product by thin-shape-izing of a case can be planned.

[0012] Moreover, the external surface and predetermined spacing are prepared, a product is supported to a suspending state a cavity and incore, and if restoration space is prepared all over a product and it is filled up with resin, the resin seal of the whole surface of a product can be carried out.

[0013]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to an accompanying drawing, and an understanding of this invention is presented. In addition, the operation gestalt shown below is an example which materialized this invention, and does not limit the technical range of this invention.

[0014] The operation gestalt shown below shows the example applied to the pack case which closes the interior object of a cell pack (product). The rechargeable battery 1 constituted by the rechargeable lithium-ion battery of a flat form as a cell pack was shown in drawing 1 , The circuit board 9 which constituted the cell protection network which protects this rechargeable battery 1 from overcharge, overdischarge, etc. is combined with one. The middle finished product 50 as shown in drawing 2 is formed, this middle finished product 50 is held in the pack case 7, as shown in drawing 3 , and it constitutes in a cell pack, without carrying out the resin seal of the open end of the pack case 7, and spoiling the gestalt of a rechargeable battery 1.

[0015] Drawing 1 is what disassembles and shows said middle finished product 50. To the obturation section side of a rechargeable battery 1 The circuit board 9 which formed the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 while constituting the connection plate 11 joined to the positive-electrode terminal 25 of this rechargeable battery 1, the spacer 12 which is arranged on a rechargeable battery 1 and offers the bearing surface of the circuit board 9, and the cell protection network is arranged. The lead plate 10 which extends on a side face from the base of the cell can 31 which constitutes the negative electrode of a rechargeable battery 1 is arranged.

[0016] Base 11b of the connection plate 11 formed in the shape of [of L] a character is joined to the positive-electrode terminal 25 of said rechargeable battery 1, base 10b of the lead plate 10 is joined to the base of the cell can 31, and lead section 10a extends to an obturation section side along the side face of the cell can 31.

[0017] Moreover, a spacer 12 is attached in the obturation section side of a rechargeable battery 1 as shown in drawing 2. Positioning fitting of the spacer 12 is carried out on a rechargeable battery 1, and the insulation between the cell cans 31 which are negative electrodes is strengthened. Moreover, lead section 11a of the connection plate 11 and lead section 10a of the lead plate 10 are joined on the circuit board 9 through a spacer 12 and the circuit board 9. Since the electronic parts mounted in the obturation section side of the circuit board 9 are held in the opening circles of a spacer 12, it will be in the condition that the laminating was carried out on the rechargeable battery 1, only in the height to which the circuit board 9 applied the thickness of the substrate, and the thickness of a spacer 12, and the increment in the height by preparing a cell protection network will be controlled.

[0018] Drawing 4 shows the circuit pattern formed in front flesh-side both sides of the circuit board 9, and the cell protection network and the input/output terminal are constituted on the substrate. As shown in drawing 4 (b), a cell protection network is constituted at the rear-face side (spacer 12 side) of the circuit board 9, and as shown in drawing 4 (a), conductor pattern 4 for plus terminals a, conductor pattern 5 for minus terminals a and conductor pattern 6a for temperature detection terminals, and the conductor pattern 16 for lead plates for connecting the conductor pattern 15 for connection plates and the lead plate 10 for connecting the connection plate 11 are formed in the front-face side. The circuit pattern formed in these both sides is connected by the through hole 30 at the key point. From the lead run through hole 20 formed in this circuit board 9, through and lead section 11a are bent on the conductor pattern 15 for connection plates, and lead section 11a of the connection plate 11 is soldered. Moreover, lead section 10a of the lead plate 10 is bent and soldered on the conductor pattern 16 for lead plates. By soldering this connection plate 11 and the lead plate 10, the circuit board 9 is fixed on a spacer 12.

[0019] As shown in drawing 4 (a), on the plus terminal 4 and conductor pattern 5a for minus terminals, the temperature detection terminal 6 is joined at the conductor pattern 4a top for plus terminals formed in the front-face side of the circuit board 9 on the minus terminal 5 and conductor pattern 6a for temperature detection terminals. These terminals become the thing excellent in conductivity, junction nature, and corrosion resistance by using the plate of a copper-nickel alloy, or the clad plate of the plate of this copper-nickel alloy, and stainless steel. Moreover, without joining a plate as a terminal, it can gold-plate at each conductor pattern, and can also use as a terminal as it is.

[0020] By attaching the circuit board 9 in a rechargeable battery 1 as mentioned above, as shown in drawing 2, the middle finished product 50 is formed. As this middle finished product 50 is shown in drawing 5 (a), on the top face 13 Plus terminal aperture 4c, In the pack case 7 where the pars basilaris ossis occipitalis 14 was wide opened as minus terminal aperture 5c and temperature detection terminal aperture 6c were prepared and it was shown in drawing 5 (c) It holds, as shown in drawing 5 (b), and the middle finished product 50 is sealed in the pack case 7 by carrying out a resin seal with the resin seal shaping equipment 60 which shows a pars basilaris ossis occipitalis 14 below.

[0021] Drawing 6 - drawing 9 show each process of the resin seal by resin seal shaping equipment 60 in order, and show it in the cross section of the 2-way which intersects a metal mold part perpendicularly with each drawing (a) and (b).

[0022] The cavity 62 and core 63 which constitute shaping metal mold enable it to correspond to the undercut produced by the sprue 67 of a gate part in drawing 6 while they are formed in rate mold structure and enable receipts and payments of the middle finished product 50. Cavernous 62a is formed in a cavity 62, and restoration space 63a of resin, the gate 66 connected with this restoration space 63a, and the sprue 67 connected with this gate 66 are formed in the core 63. Moreover, the core 63 is energized in the direction which separates from a cavity 62 with a spring (elastic member) 64. A cavity 62 is opened so that it may illustrate, the open end is made into a core 63 side, and the middle finished product 50 on which the pack case 7 was put is inserted into cavernous 62a.

[0023] Next, energization of a spring 64 is resisted and a cavity 62 is made to press a core 63 by closing a cavity 62 and a core 63 and making the resin impregnation nozzle 65 advance to a cavity 62 side, as shown in drawing 7. Since restoration space 63a which the core 63 stuck to the cavity 62 and was formed on the open end of the pack case 7 at the core 63 is located as shown in drawing 8, if the regurgitation of the resin 70 is carried out into sprue 67 from the resin impregnation nozzle 65, it will fill up with resin 70 in restoration space 63a through the gate 66. The resin seal of the open end of the pack case 7 is carried out by restoration of this resin 70. Moreover, since the resin 70 with which it filled up trespasses also upon the clearance between the pack case 7 and the middle finished product 50, it is unified, and even if the pack case 7 and the middle finished product 50 constitute the pack case 7 with thin resin mold goods,

reinforcement is compensated with them, and a cell pack can be miniaturized.

[0024] After stiffening filled resin 70, if a cavity 62 and a core 63 are opened and the resin impregnation nozzle 65 is retreated as shown in drawing 9, the cell pack by which resin seal shaping was carried out can be taken out. Since garbage 70a made by the gate 66 and sprue 67 remains as shown in drawing 10 (a), as shown in drawing 10 (b), the pack case 7 and the cell pack which covered the middle finished product 50 with resin 70 complete the fabricated resin 70 by cutting this off.

[0025] The resin seal shaping equipment 60 explained above is constituted so that the resin seal of the pars basilaris ossis occipitalis of the pack case 7 opened wide may be carried out, but it can insert the middle finished product 50 into the case which uses a top face as an open end, and it can also constitute it so that opening may be formed in a part for a terminal area and the resin seal of the top face may be carried out. This can be carried out by forming in restoration space 63a of a core 63 the lobe which contacts a part for a terminal area.

[0026] Moreover, as shown in drawing 11, when the volume forms at the size to which cavernous 62a formed in a cavity 62 is made by the gap to the perimeter of the middle finished product 50 and prepares and constitutes the pin 75 which supports the middle finished product 50 to a suspending state at two or more places of the wall of cavernous 62a, the perimeter of the middle finished product 50 is filled up with the resin 70 poured in from the resin impregnation nozzle 65 so that it may illustrate, and it can carry out the resin seal of the whole surface. Also in this case, opening is formed in a part for a terminal area as mentioned above.

[0027] The resin used for resin seal shaping explained above becomes what has the suitable hot melt of a polyamide system and a polyurethane system. Moreover, by adjusting so that the degree of hardness when stiffening resin may become low, the effectiveness of an impact absorption is acquired, the shock resistance to impacts, such as fall, improves in a cell pack, and it will become suitable as a power source of pocket electronic equipment.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The decomposition perspective view showing the configuration of the middle finished product concerning an operation gestalt.

[Drawing 2] (a) which shows the configuration of a middle finished product is a top view and (b) one end side Fig.

[Drawing 3] The perspective view showing the completion condition of a cell pack.

[Drawing 4] (a) which shows the configuration of the circuit board is a front-face side, and (b) is a top view by the side of a rear face.

[Drawing 5] For a plan and (b), a side elevation and (c) are [(a) which shows the configuration of a pack case] a bottom view.

[Drawing 6] The sectional view in which showing the configuration of resin seal shaping equipment in the cross section of the 2-way (a) which intersects perpendicularly, and (b), and showing the condition of the 1st process.

[Drawing 7] The sectional view showing the condition of the 2nd process of the same as the above.

[Drawing 8] The sectional view showing the condition of the 2nd process of the same as the above.

[Drawing 9] The sectional view showing the condition of the 3rd process of the same as the above.

[Drawing 10] It is the sectional view in which (a) shows the completion condition of resin seal shaping, and (b) shows the completion condition of a cell pack.

[Drawing 11] The sectional view showing the configuration which carries out the resin seal of the whole surface of a cell pack.

[Drawing 12] The perspective view showing the configuration and assembly sequence of the cell pack which becomes a configuration conventionally in order of (a), (b), and (c).

[Drawing 13] The fragmentary sectional view showing the junction condition of the pack case which becomes a configuration conventionally.

[Description of Notations]

7 Pack Case

50 Middle Finished Product (Product)

60 Resin Seal Shaping Equipment

62 Cavity

62a Cavity

63 Core

63a Restoration space

64 Spring (Elastic Member)

65 Resin Impregnation Nozzle

66 Gate

70 Resin

[Translation done.]

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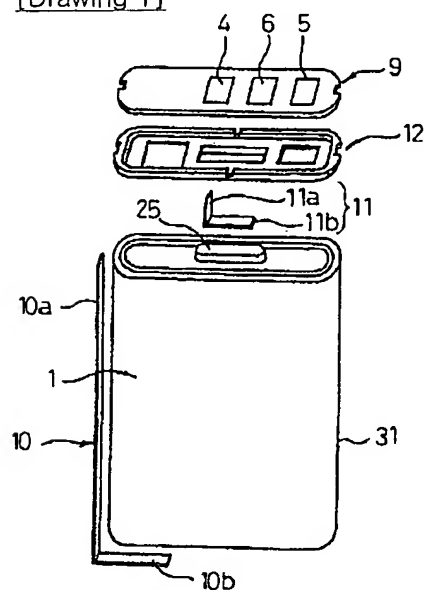
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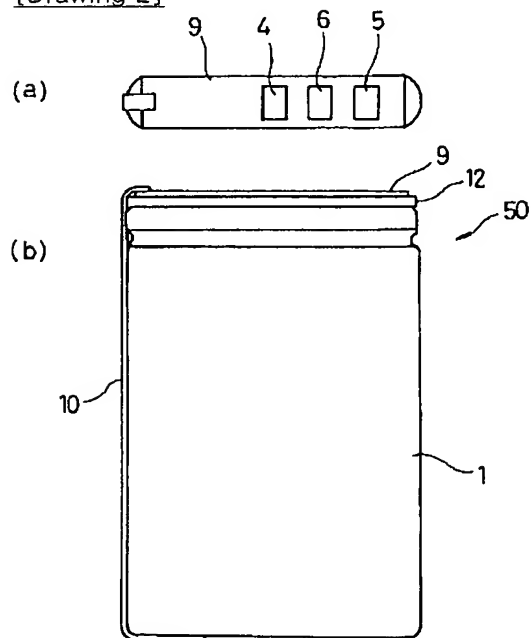
3.In the drawings, any words are not translated.

DRAWINGS

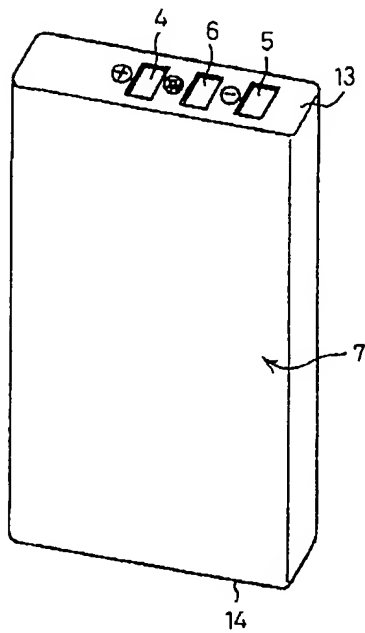
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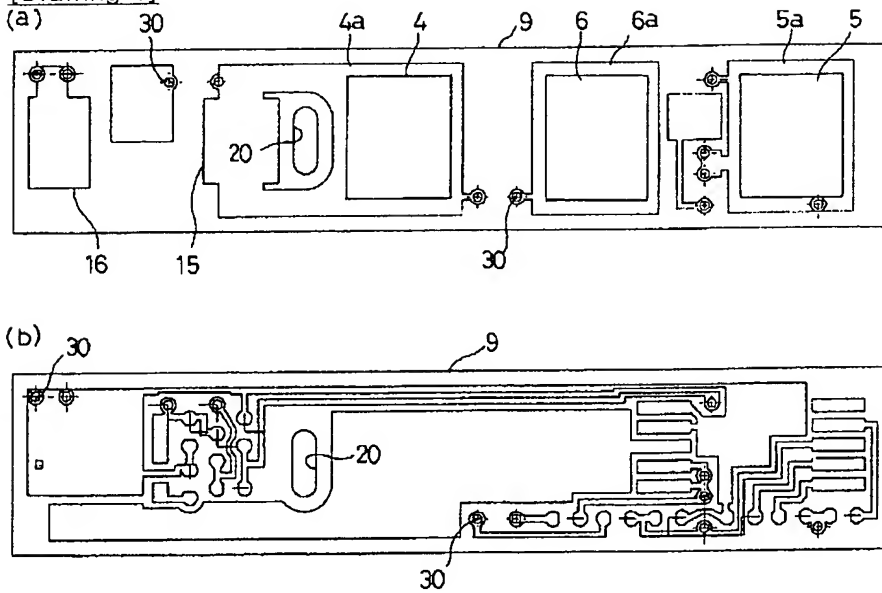
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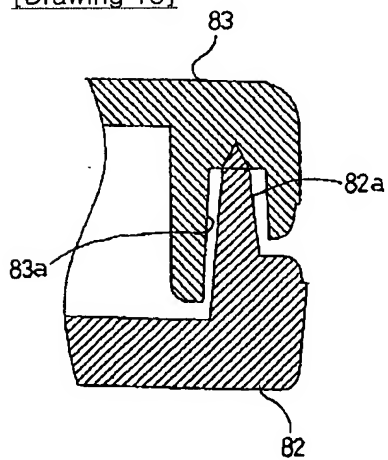
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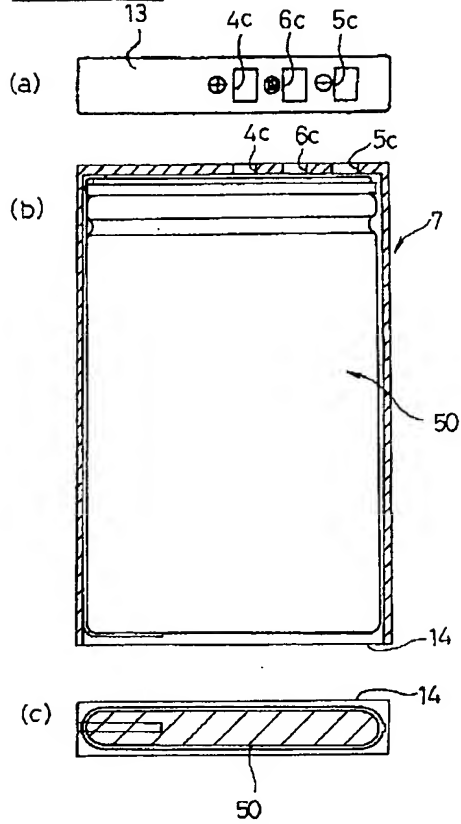
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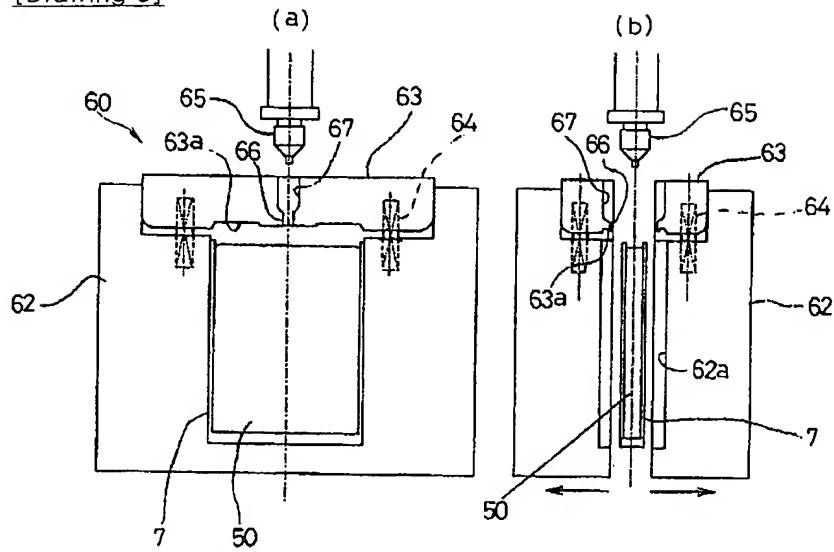
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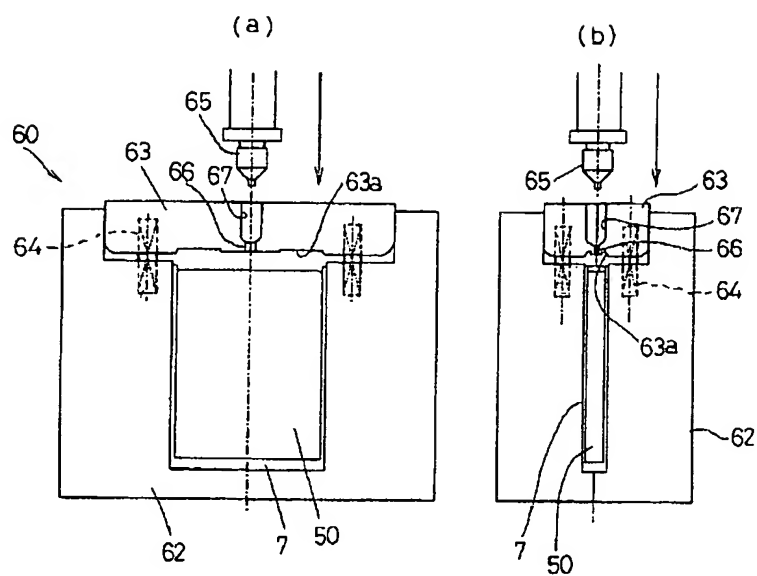
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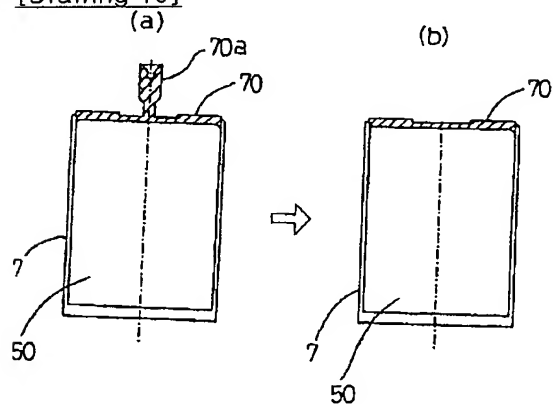
[Drawing 6]



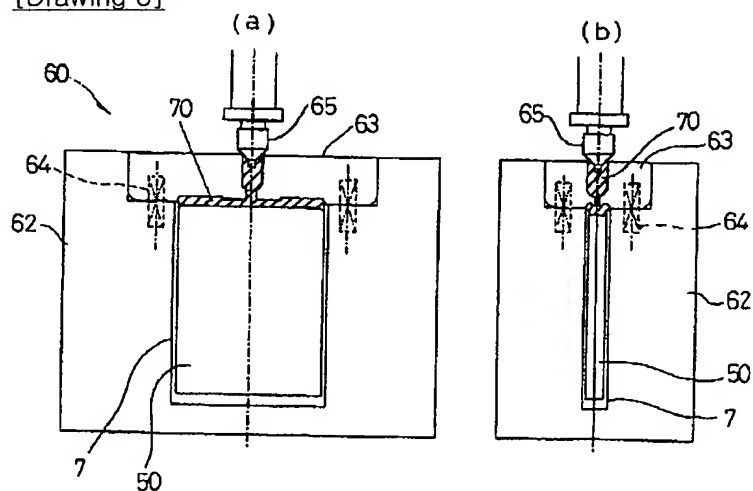
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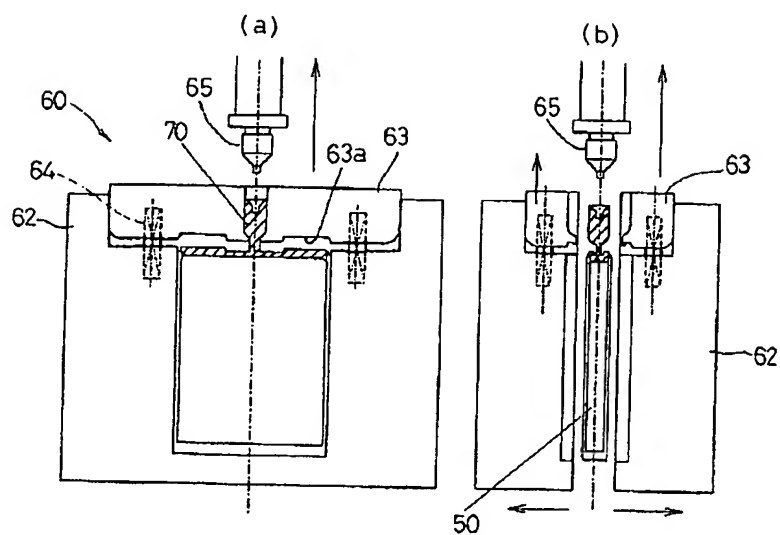
[Drawing 10]



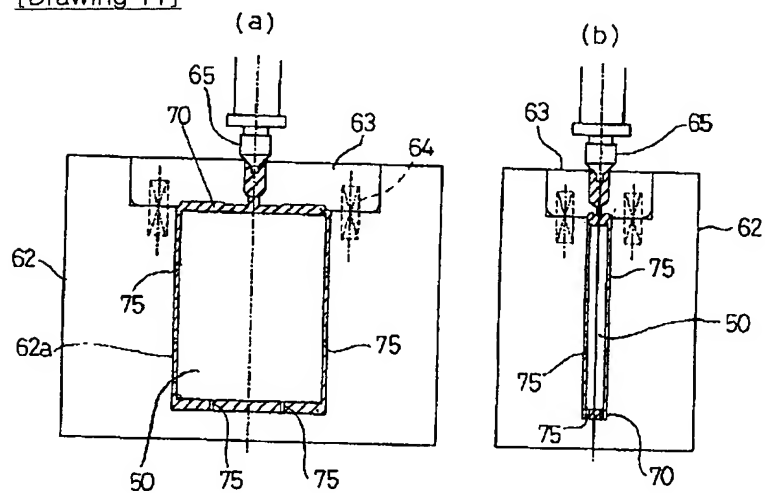
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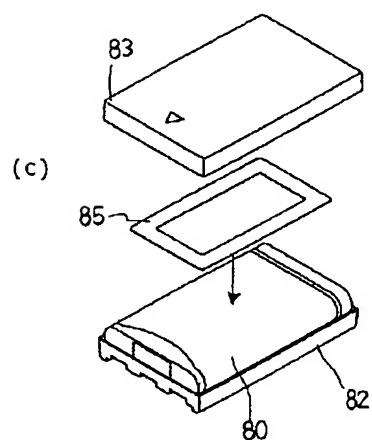
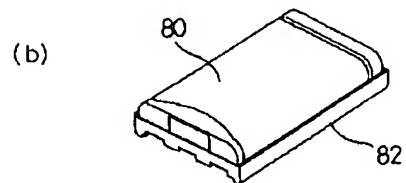
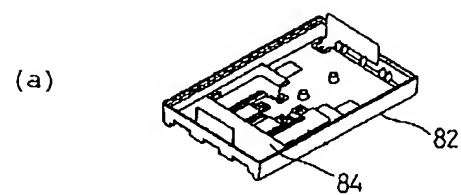
[Drawing 9]



[Drawing 11]



[Drawing 12]



[Translation done.]